



Mill Test Certificate

Bri-Steel Manufacturing
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Product: Seamless Carbon Steel Pipe Product Heat Number: BSM-2959 Product Size: NPS 20 SCH 100 Production Date: Nov 21, 2016
 Production Method: Hot Expansion Product Heat Treatment: Normalizing Forming Certificate No.: MTR- 003057

Product Standards: ASME B36.10M-2015, ASTM/ASME A333-2016/SA333-2015 Grade 6 LT(M45C) A106-2014/SA106-2015 Grade B/C NDE, A53-2012/SA53-2015 Grade B Type S, NACE MR0175/ISO 15156-2:2009 MR0103/ISO 17495:2015

Product Markings
 NPS 20 SCH 100 1.281 INCHWT SMLS 2016/11 NDE
 HEAT BSM-2959 (PIPE # LENGTH MASS) 256.1lb/ft ASTM/ASME A/SA333 GR 6 LT(M45C) A/SA106 GR B/C A/SA53 GR B NACE MR0175/MR0103 MADE IN CANADA

Product: Details		Non-Destructive Testing												
Heat	Test Type	Product Size	Pieces	Length	Mass lb/ft	Geiger μ R/hr	Res. Mag. Gauss	Visual Insp.	OD	UT (WT) ASTM E114	UT ASTM E213	ET ASTM E309	Hydro Test	End Condition
BSM-2959	Heat	NPS 20 SCH 100 1.281in. WT	4	DRL	256.1	<5	<10	Pass	Pass	Pass	N12.5 Pass	-	-	Plain End

Chemical Analysis (wt%)																		
Heat	Steelmaking Method	Test Type	C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	CE(IIW)	CE(IIW)Max	CE(CSA)
BSM-2959	Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed	Heat	0.16	1.29	0.008	0.002	0.25	0.02	0.01	0.01	0.01	0.050	0.001	0.001	0.0001	0.39	-	0.38
		Product	0.16	1.28	0.011	0.003	0.28	0.05	0.01	0.01	0.01	0.057	0.002	0.001	0.0003	0.40	-	0.39
			0.17	1.30	0.013	0.003	0.28	0.05	0.01	0.01	0.01	0.058	0.002	0.001	0.0003	0.41	-	0.41

Mechanical Properties									
Heat	Test Type	Microstructure	Hardness	Flattening Test	Tension Test 2 in. GL	Yield (Rt0.5) psi	Tensile (Rm) psi	Y/T (Rt0.5/Rm)	Elongation (A) %
BSM-2959	Heat	Ferrite & Pearlite	84 HRBW	Pass	Longitudinal; 0.5 in. Round Bar	53 500	72 500	0.74	33
				Pass	Longitudinal; 0.5 in. Round Bar	61 500	81 000	0.76	34

Heat	Test Standard	Result	Impact Test Sample Details	Temp °C	Impact Energy Min. (J) (3 Tests) AVG	Impact Energy Results (J) (3 Tests) AVG	Shear (%) (3 Tests) AVG	Lateral Expansion (mm) (3 Tests) AVG
BSM-2959	ASTM A333	Pass	CVN Long 10 x 10 mm	-45	(14/14/14) 18	(188/278/252) 239	(100/100/100) 100	(2.01/2.38/2.27) 2.22

Additional Details:

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing in accordance with ASTM/ASME A333-2016/SA333-2015, A106-2014/SA106-2015, A53-2012/SA53-2015, and the purchase order requirements, and that the results meet the corresponding requirements. Bri-Steel Manufacturing is registered and certified to ISO-9001:2008 (APIQR-1584), API Q1, and PED 2014/68/EU.
- ✓ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour Service, and NACE MR0103/ISO 17495:2015 Section 13.1
- ✓ No weld repairs have been performed on this product.
- ✓ This product has not come into contact with mercury during the Bri-Steel Manufacturing processes.
- ✓ This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1.

Mill Test Certificate approved by:

Tilman NOV 28 / 2016

Tonya Lam, P. Tech (Eng.)
 Assistant QA Manager